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ABSTRACT

The prevention of injuries and control of hazards in individual and dual sports is outlined. A separate chapter is devoted to each of twelve sports: archery, bowling, equitation, golf, gymnastics, marksmanship, track and field, weight training and weight lifting, fencing, racquet sports, judo, and wrestling. (MB)

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SAFETY IN INDIVIDUAL AND DUAL SPORTS

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Sports Safety Series

Monograph #4

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Safety in Individual and Dual Sports

Monograph #4
Sports Safety Series

Co-Editors
Joseph Borozne
Chauncey A. Morehouse
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Foreword

This is the fourth of the six monographs which comprise the *Sports Safety Series*. This series is designed to provide a comprehensive guide for individuals concerned with the prevention of injuries and control of hazards in all areas of sports and recreation.

These monographs constitute a revision of the textbook, *Sports Safety*, which was originally published in 1970 by the Safety Education Division of the American Association for Health, Physical Education and Recreation (AAHPER). The American School and Community Safety Association (ASCSA) replaced the Safety Education Division as an association within the new structure, the American Alliance for Health, Physical Education and Recreation (AAHPER). Therefore, it is logical that the ASCSA should assume the responsibility for the revision of the textbook dealing with safety in sports activities.

In the original publication all contributions were contained in a single volume but a new format has been developed for this revision. The material has been printed in six small monographs which may be purchased as individual publications. For those individuals who desire to obtain all six monographs, a limited number of all of the booklets are bound into a single volume which is available at considerably less than the total cost of all six publications, if purchased separately.

The first monograph is titled, *Administration and Supervision for Safety in Sports*, the second, *Accident Surveillance Systems for Sports*, the third, *Safety in Team Sports*, and this the fourth is titled, *Safety in Individual and Dual Sports*. The final two monographs are titled, *Safety in Aquatic Activities*, and *Safety in Outdoor Recreational Sports*.

The ASCSA and the Co-editors are deeply indebted to the several individual authors who are identified in the list of contributors for each monograph. In many cases the authors were kind enough to provide a complete revision of their original contributions, in other instances only an up-dating of the material was necessary. Alternate authors consented to rewrite other designated chapters because the original authors were unavailable.

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Chapter 1

ARCHERY

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Introduction

The incidence of injury due to participation in instructional and recreational archery appears to be extremely small. If serious injuries are occurring in archery programs, they are not being reported. (2)

Emphasis upon safety has been traditional in organized archery programs. Archery teachers and supervisors have long recognized the potential for serious injury in archery and have adopted stringent safety rules and standards.

There is little doubt that carelessness with a bow and arrow can result in serious injury and even fatality. The bow and arrow, in the hands of a careless and/or inexperienced person, is a lethal weapon. The power of an arrow shot from a 45-pound bow is comparable to a bullet shot from a 30:06 rifle.

A discussion of archery safety can logically be divided into the following topical areas:

1. Range selection and construction
2. Care and use of equipment
3. Class organization
4. Instructional techniques
5. Recreational shooting

Discussion in each area includes a list of specific safety considerations. These lists should prove valuable to teachers, supervisors and administrators for analyzing present practices concerning archery safety.

Range Selection and Construction

Instructional programs in archery may be taught in either indoor or outdoor settings.

The indoor range provides a more finite, controlled environment for instruction. It is generally easier to control entry to the range by non-participants. Student behavior is more easily scrutinized on the indoor range. Indoor ranges need not be permanent facilities; gymnasiums, large multi-purpose areas, isolated hallways, etc., may serve as indoor ranges during the instructional period. If the facility is designed to be portable, the equipment may be removed after class and the space utilized for other purposes.

The outdoor range provides a more natural and unrestrained atmosphere. Fresh air and open spaces add to the aesthetic value of archery participation. Outdoor ranges generally lend themselves to shooting at longer distances as well as for a wider variety of activities such as bow-bird shooting, clout and archery golf.

Safety Checklist — Indoor Range

1. The range should be sufficiently isolated from other school activities so that non-participants are not endangered.
2. Entry to the shooting range should be limited to an area in back of the shooting lines.
3. All doors providing access in front of the shooting lines should be locked.
4. All windows in front of the shooting lines should be closed and fitted with a protective cover to prevent arrow penetration.
5. An arrow backstop, i.e. nylon net or rug, should be suspended behind the target bales.
6. All obstacles which may cause arrow deflection should be removed from the range.
7. Definite parallel shooting lines should be established for each shooting distance.
8. Target bales (mats) should be sturdily supported so that they cannot be upset easily.

Safety Checklist — Outdoor Range

1. In site selection, take advantage of the natural terrain. It is best if arrows are shot toward a hill or an embankment.
2. Choose an area which is free from obstructions such as trees, wires, etc.
3. Establish a "clear" area behind the target bales. An area twice the distance of the longest shooting yardage is needed.
4. Barriers and signs should be placed around the outdoor range to limit access by non-participants.
5. Definite shooting lines should be established for each shooting distance. (See also, Safety Checklist — Class Organization, No. 7)
6. A site isolated from normal pedestrian and motor traffic should be selected.
7. Target bales (mats) should be sturdily supported so that they cannot be upset easily.

Care and Use of Equipment

It is important that archery equipment be kept in good condition for safety and instructional efficiency. Improper and/or poorly maintained equipment makes it more difficult for students attempting to learn new skills. An injury caused by equipment failure can negate years of safe and wholesome participation in the view of some administrators. Equipment failures due to abuse, neglect, and aging are, for the most part, preventable when there is adequate instructional supervision.

Safety Checklist — Equipment

1. Each student should shoot with a shooting tab or glove. The string can abrade the fingers and cause blisters.
2. It is imperative that each student wear an arm guard when shooting. A string slap on the forearm can cause a painful injury.
3. Bows should be checked periodically for cracks and stress marks. Cracks are easily identified. Stress marks appear as frosted areas in fiberglass and laminated bows.
4. Strings should be checked regularly for signs of abrasion and wear. Worn strings should be discarded.
5. Arrows should be checked to make certain all feathers are securely fastened to the shaft. A loose feather can puncture and even penetrate the bow hand of a shooter. Cracked or splintered arrows should be discarded immediately. (See Figure 1.)
6. All bows should be strung to their recommended string heights. An understrung bow can cause a severe wrist slap.
7. It is extremely important that arrow length be matched to the shooter's draw length.

Arrows must be long enough so that they cannot be overdrawn when the shooter comes back to a full draw (anchor) position. An overdrawn arrow can lead to a situation hazardous to the shooter and to persons near him. (See Figure 2.)

8. Students should be cautioned never to draw the bowstring back to the full draw position and then release the string without having an arrow on the string. Such a procedure may break the string and/or the bow. The flying fragments could strike the shooter.

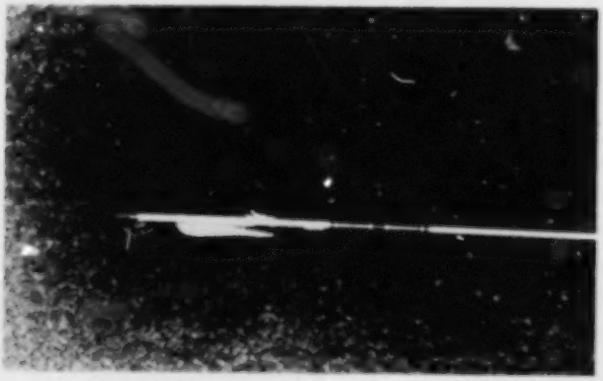

Figure 1: Damaged arrows can inflict painful injuries

Figure 2: Overdrawing can have disasterous results (see arrow)

Class Organization

Archery classes should be organized for both safe and efficient instruction. The "partners" system works very well for beginning archery instruction. Each studen, has a partner who is similar in build and has the same eye dominance. One person shoots while the other observes, coaches and generally helps the person shooting. Standard procedures should be established for supervising shooting on the range, retrieving arrows, target assignments, etc.

Safety Checklist — Class Organization

1. Students should be assigned to a specific target. A maximum of four students should be assigned to a target.
2. The shooting line should be sufficiently long so that each shooter has enough room to shoot without interference from others on the shooting line.
3. Between shots, each person should position his bow in a vertical plane with the tip of the lower limb resting at his feet. This ensures that his bow will not interfere with other shooters. (See Figures 3 and 4.)
4. Commands (verbal or whistled) should be established to signal students when to commence firing, cease firing and to retrieve their arrows.
5. Students should be instructed to step back one yard behind the shooting line when they finish shooting. When the shooting line is clear, the instructor can then signal them to retrieve the arrows. (See Figure 5.)
6. All arrows should be retrieved at the same time. Never allow a student to retrieve arrows while others are shooting.
7. Students should never be allowed to shoot from different shooting lines at the same time. *If you want students to shoot at different distances, move the target bales to staggered positions.*
8. A single person (target captain) should withdraw the arrows from each target. All other shooters should stand in safe distance back and to the side from the target. An eye could easily be poked out by an arrow as it is withdrawn from the target. (See Figures 6 and 7.)
9. When a student retrieves arrows behind the shooting backstop, a bow should be leaned in front of his target bale as a signal to the other shooters that he is behind the barricade.
10. If an arrow should fall off a shooter's bow in front of the shooting line, the arrow should not be retrieved until a cease fire signal is given.

Figure 3: This situation could be extremely dangerous to both shooters (see arrow)

Figure 4: Positioning the bow vertically solves the problem

Instructional Techniques

Safe instruction is extremely important both to the instructor and to his students. Students who experience pain or unpleasantness as they attempt to learn to shoot a bow and arrow are likely to reject archery because they may feel it is not beneficial or fun. The instructor may also be injured as a result of unsafe practices committed by himself or his students.

Safety Checklist — Instructional Techniques

1. From a safety standpoint, the step-through method of bow stringing is best. (See Figure 8.) The instep method requires more strength and is potentially much more hazardous. A slip of the hand could result in a severe eye injury. Use of a bow stringer is recommended by most archery manufacturers. When using a bow stringer, care should be taken to turn the head and face away from the bow limb being strung.
2. An open stance is recommended for beginning shooters. The open stance increases the string clearance between the bow arm and the return path of the bowstring.
3. Clothing of each shooter should be checked. Large buttons, pins, watches, bulky sweaters, eye glasses and pens and pencils in shirt pockets, should be removed before shooting.
4. When instructing an individual student, stand behind the shooter. Never pass your arm or hand between the bow and the drawn string when helping a student. If the student releases the string, it could break an arm.
5. When students are shooting, the instructor should stand behind or at one end of the shooting line. *Never* stand and instruct from a position in front of the shooting line when students have nocked arrows.
6. Students in beginning instruction should use bows they can pull easily. Overbowing is hazardous and inefficient for the beginning student.

Figure 5: Make sure the shooting line is clear before signaling "retrieve"

Figure 6: That arrow could do a lot of damage to an eye

7. Students should be taught the proper technique for withdrawing arrows from the target mat. Caution students to watch for others behind them when they withdraw the arrows. (See Figures 6 and 7.)

8. In instruction, emphasize the importance of a definite anchor point. Variation in the anchor can lead to an overdraw.

9. Create an attitude and concern for safety concomitantly with your archery instruction. Safety is a way of thinking and doing.

Figure 7: When retrieving arrows, be certain people are a safe distance away and watch behind you when you withdraw an arrow

Figure 8: The step-thru method of bow string is best for safety

Recreational Shooting

Safety is extremely im. rtant when the bow and arrow are used for recreation. People tend to become less safety cons. us in informal recreational settings than during an instructional class. Efforts must be made at all times o stress the importance of safety to students so that they carry over safe practices to their recreational pursuits. Archery games and bow hunting constitute recreational uses of the bow and arrow. The checklist below provides some specific safety considerations for recreational shooting.

Safety Checklist — Archery Games

1. When clout shooting, choose an area completely free from barriers and/or obstructions. Shrubs, trees and buildings can screen pedestrians from the shooter's view.
2. A field space at least 150 yards long and 100 yards wide is necessary for clout shooting. A large "safe" area must be provided behind the clout target for overshot arrows.
3. The overdraw is a real hazard when shooting bow birds. It can be controlled somewhat by using a ready signal. At the "ready" signal all shooters come to a full draw and then the bird is thrown by the instructor.
4. Blunt arrows with Flu-Flu fletching should be used for bow-bird shooting.
5. In archery golf, all participants (especially up close to the target) should stand behind the person taking a shot.
6. An arrow should never be shot aimlessly into the air.

Safety Checklist — Bowhunting

1. All hunting arrows should be carried in a quiver which encloses the broadhead points.
2. It is an extremely hazardous practice to carry a hunting bow with an arrow nocked on the string. The arrow should be nocked only when game is in sight.
3. Be certain of your target before you shoot. In the field, people can easily be mistaken for game animals. The power of suggestion "early image" has an uncanny effect upon what people imagine they see. If you are not completely certain of what you see, don't shoot. "Sound" shooting is inexcusable.
4. Many wounds to bowhunters are self-inflicted. A hunting arrow is extremely sharp and should be treated in the same manner one would treat a knife.
5. In states which allow hunting from tree blinds, injuries occur when people attempt to climb trees carrying a bow. Tie a string to the bow, climb the tree and then pull up the bow.
6. When crossing a fence, lay the bow on the ground next to the fence, cross, and then reach through for the bow.
7. When hunting with a partner, know his position at all times.

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Chapter 2

BOWLING

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Bowling is one of the safest sports offered to the public providing proper equipment is selected and a few basic rules are followed.

Most experts agree that the Ancient Egyptians originated bowling seven thousand years ago. However, bowling at pins began in Europe about 17 centuries ago and the game as a sport has progressed a great deal since then. At that time bowling could be done either indoors or outdoors and round stones were used to knock down wooden kegels. In the 15th century, Martin Luther standardized the number of pins at nine and drew up the basic rules for the game (4).

Today ten pins are used and bowling has grown to be the world's largest participant sport. The human pinspotter of yesterday has been replaced by automatic pinspotters and other sophisticated electronic machinery. Today's bowler enjoys vastly improved equipment and bowls in air conditioned comfort.

In bowling the beginning bowler has the advantage in that he does not have to invest a large sum of money in equipment. Bowling balls can be used free of charge and bowling shoes can be obtained for a nominal rental fee. In addition, free instruction is available at most bowling establishments.

It is most important that the bowler select proper equipment. Bowling balls are made of hard rubber and generally range in weight from eight to sixteen pounds, and are about nine inches in diameter. Most balls have a triangular set of three holes for the thumb and the middle fingers. In choosing a ball, select the heaviest ball that can be handled comfortably. In determining proper fit, insert the thumb of your bowling hand fully into the thumb hole and extend the two middle fingers over the finger holes. If the ball fits, the first joints of the second and third fingers of the bowling hand should extend approximately one quarter inch beyond the outer edge of the holes. The thumb should not stick in the thumb hole nor be too loose. In turning the hand, one should feel only the slightest bit of friction. To test the proper fit, try to insert a pencil under the palm of your hand while gripping the ball. When the span is too narrow, you'll feel a pinching sensation. When the span is too wide, there'll be a stretching. (3) A loosely-fitted ball feels twice as heavy and may be dropped before the ball should be released. A ball that is too tight or has too narrow a span may possibly be lobbed. When balls are purchased at bowling establishments, proper fitting and drilling will be done free of charge.

Bowling shoes are required by all sanctioned bowling establishments. Since the right-handed bowler slides on his left foot when delivering the ball, his left shoe has a sole of either hard leather or buckskin to permit sliding. The right shoe has a rubber sole to help brake the bowler as he approaches the foul line. For the left-handed bowler the reverse is true. Basically, select a shoe that fits comfortably and be sure that shoelaces are not dragging on the floor.

In selecting clothing, the bowler should choose comfortable clothing that allows freedom of

movement. Loose fitting shirts and slacks of shoe top length may be worn by men, while a blouse and slacks or skirt are suitable for women.

A wise safety measure is to inspect the approach of the lanes for foreign debris. If the lanes appear to be free of foreign objects, the bowler should take a few practice approaches and slides to further check for any slippery or sticky spots. Wipe up any slippery spots with a rag and steel wool any sticky spots.

When picking up the ball, be sure to keep the hands away from the opening of the ball return so that hands will not be injured by returning balls. Turn the ball so that the holes are facing upward. Both hands should be used to lift the ball from the rack, and a line drawn between the hands must be at right angles with the length of the ball rack. Once the bowler approaches his starting position, then he may insert his fingers into the holes, while using his free hand to support the weight of the ball.

Most bowlers bowl just once a week. It is always a good idea to do a few stretching and loosening up exercises before attempting to "fire" the ball down the lane to get the first big strike of the day. Although bowlers may use a three-, four-, or five-step approach, the four-step method is generally recommended. In determining the proper starting position the bowler should count off four and one half steps back from the foul line. This spot will be the starting position and will allow for the four-step approach and slide. In taking the starting stance, the left foot should be in the exact center of the bowling lane and placed so that the right foot and right shoulder are lined up with the target. The weight of the ball is still in the left hand, the elbows are kept in towards the body, and the knees are slightly bent.

During the first step, the right handed bowler leads with the right foot while pushing the ball down and slightly to the right. The ball should not be forced, but should swing naturally. In the second step, the downward movement continues and the left hand leaves the ball. At the third step, the ball is at the peak of the backswing, about shoulder height and never beyond. Finally during the fourth step and slide, the ball is delivered. The slide should be from six to twenty-four inches and should finish just short of the foul line. Remember keep footwork natural and maintain a walking pace.

In releasing the ball, it is important to keep the wrist straight and firm. The thumb should be in a 12 o'clock position and should come out first followed by the fingers. The ball should be placed down about four inches over the foul line. There is no need to twist the hand to increase pin action. Pin action is a result of lift from the fingers combined with proper follow through. The hand reaches out to the pins as the ball leaves the hand and the arm continues its natural upward motion until it reaches at least the shoulder level. The bowler must remember to observe the foul line and to confine body english to his own lane. Upon finishing his frame, the bowler should leave his ball in the bowling rack and sit down until it is his turn to bowl again, since only one person is allowed on a lane at a time.

Etiquette has its place on the bowling alley and a few simple rules can make the game safer and more enjoyable for all:

1. When two bowlers are on the approach at the same time the bowler to the right delivers the ball first.
2. Never take practice swings with your bowling ball on the concourse or behind the approach.
3. Be prepared to bowl when your turn arrives.
4. To avoid sticky spots on the lanes, refreshments should never be taken onto the approach and should be consumed in a suitable area set aside for this purpose.

Bowling is a most enjoyable form of recreation. As in all other activities better performance comes with practice but safety should always be paramount.

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Chapter 3

EQUITATION

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Accident prevention and safety in equitation consist of a fine balance amor.g the rider, horse, and equipment.

Rider

The inexperienced rider should begin on an experienced, calm horse (a "school" horse for beginners) under qualified supervision. As the ability of the rider increases, a less experienced and skilled horse can be used with a reasonable degree of safety. Rider ability can be improved to a level where the rider can train "green" horses safely. A person with normal intelligence and some athletic ability can become an experienced rider by hard work.

Horse

A desirable horse has average intelligence, is not awkward, and has a good disposition and good eyesight. A stupid horse cannot learn to keep himself and the rider out of trouble. A clumsy horse can cause falls because he "gets in wrong" at ditches and jumps. An uncooperative, ornery horse can cause much displeasure, as well as danger. A horse with an inherently cooperative personality can be made uncooperative and fractious by continually being punished through improper riding techniques. The most common punishment for a horse is "bad hands" on the part of the rider; this practice produces an almost persistent irritation to the horse's mouth by pulling on the reins at the wrong times. Such improper treatment is the reason for constant reschooling of those horses used for teaching beginners.

An overfed (particularly with grains) and underexercised horse is naturally "hot." The horse that is kept "at grass" and with a field of sufficient size in which to exercise tends to be less troublesome, even though ridden only occasionally. Any horse which has not been ridden for a period of time should be worked on a lunge line for a short period immediately prior to mounting and riding. Grooming of the horse before riding also has a quieting influence. The horse's feet should be checked and cleaned prior to each ride.

The approach to the horse for any purpose should always be from the front or side, never from the rear where there is danger of being kicked. When grooming and when walking to the rear of the horse, one should stay close to the horse's body. Then, even if he should kick, he would merely push the rider out of the way.

Equipment

The type of equipment needed is directly related to the ability of the rider and the training of the horse.

A youngster riding bareback must encircle his legs around the horse's waist (just behind the shoulder) in order to secure his position. The horse accustomed to this manner of riding who has a quiet disposition and is kept at grass is a perfect companion. The bridle and reins need be nothing more than a piece of rope, and the bit, a leather thong such as the Indians use, or a hard piece of straight rubber. For an agile rider, no ride could be more enjoyable or safer. However, the situation is usually more complicated, and thus further recommendations for safety are considered to be important.

The bridle should be of proper size and fit for the horse. If it is too loose, it may fall off; if too tight, it will irritate the horse. The bit should be adjusted so that it causes only a slight wrinkle at the corner of the mouth, and should be no more "severe" than what the rider and horse have become accustomed to. The reins and leather of the bridle should be in good condition, for a break in either under the stress of a good gallop can cause loss of control and disaster.

The type of saddle is of minor importance. Certainly, for long rides, the rigors of polo or wrangling, or for the duration and stress of a fox hunt, it should be comfortable, of suitable size to the rider, and built for the type of riding for which it is being used.

More important than the saddle itself are its accessories. The stirrup straps should be in good condition and attached to the saddle in such a way that the saddle will readily come loose in case of a fall. A stirrup strap broken on landing on the other side of a jump or on making a sharp turn on a cutting horse, or under most circumstances, can prove disastrous and produce a dangerous fall for an unwary or nonagile rider.

The stirrup should be well constructed, free of breaks or cracks, large enough so that the foot cannot become hung in the stirrup, and suitable for the occasion. The girth and its buckles need to be inspected for wear and tear prior to putting on the saddle. Once the saddle is fixed in place, the girth should be sufficiently tight to allow mounting without the saddle turning on the horse and throwing the rider upon the ground. Once the rider is mounted, the tightness of the girth needs to be rechecked, as the weight of the rider frequently produces looseness. If one has been riding for an hour or two, the circumference of the horse has become less with the exercise and the girth needs to be checked for looseness, and then tightened if necessary. Inadequate girth tightness during and after mounting accounts for a large percentage of rider injuries. The billet straps, which attach the girth to the saddle, also should be inspected.

Personal equipment for the rider depends upon the occasion. A wrangler needs his chaps to protect his legs from the undergrowth. A fox hunter needs his boots so that the stirrup leather, resting against the shin bone for security, will not bruise the leg. A polo player frequently is aided by knee guards to prevent injuries on bumping. A pony clubber, a fox hunter, and a show jumper need to wear a hard hat to prevent head injuries from falls and for protection against tree limbs. The polo player needs a hard hat for protection from the hot sun in open spaces. Heels are needed on boots to prevent the foot from slipping through the stirrup. (Avoid rubber soles, as they are particularly dangerous).

Injuries

The majority of serious injuries incurred in horseback riding fit into three categories.

First, it is the inexperienced rider who buys a country place and a horse and then puts the horse out to pasture. The owner goes to the country every few weeks and on one weekend decides to ride the horse. The rider is either frightened or overconfident. In either case, the horse gets going at too great a speed and the rider falls, or the girth isn't fastened and the rider falls, or the stirrup straps are not inspected and they break.

Second, a youngster is having a birthday party. The mother thinks it would be nice for all the children to ride around on a horse as a part of the entertainment. She knows a neighbor who owns a horse, but she does not know the horse and usually does not know the essentials of safety in riding. The most frequent cause of the resultant broken wrist or broken arm is a loose girth, which allows the child to roll off the horse, even at a walk.

The third example involves individuals who rent horses from a riding stable which rents horses at an hourly rate to anybody who wants to ride, without inquiring about the person's riding ability. Frequently the riders do not know enough to ask any questions about the horse and equipment. The result is usually an inexperienced rider on a horse that is accustomed to galloping vigorously for the entire hour, or on a horse accustomed to turning back and heading for the barn at the first opportune moment. Such horses are often untrained or incorrectly handled, and frequently the riding equipment is in poor condition.

In well-organized riding schools, the incidence of injuries is almost nil. When they do occur, they are usually minor. The supervision, teaching, health, care and quality of the horses are excellent. The training of the rider is graduated and cautious. The equipment is in good condition.

Despite the infrequency of injury, the high cost of liability insurance is a primary prohibitive factor in the establishment of quality riding academies. It is extremely difficult to make ends meet financially when this cost of liability coverage is added to the expense of running such an establishment. For more detailed information, see the weekly periodical, *The Chronicle of the Horse*, Middleburg, Virginia; it covers almost every phase of horse activity and is interesting reading.

Fox hunting, show jumping, pony clubs, one day events of the United States Combined Training Association, and general horse shows seldom involve injury. Why are injuries in these areas so infrequent? The answer lies in the proficiency of skills attained by the riders and horses participating in these activities.

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Chapter 4

GOLF

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Golf, like many other noncontact sports, is not considered particularly dangerous. Safety should not be overlooked, however, since serious and sometimes fatal injuries can result if a golfer is struck by a golf ball or club. Golfers can best protect themselves from injury by obeying the rules of etiquette and using common sense.

If not cautious, a golfer may injure himself, another player, or a caddy before joining his playing companions on the first tee. Practice shots should be confined to the designated practice area. Some courses — particularly municipal courses — allow golfers to practice using their own balls and shag bag. On such courses a golfer might want to use a shagger to retrieve his balls. If a player uses a shagger while practicing, the shagger should (1) know how to shag, (2) not be in danger of being struck by golf balls hit by other golfers, and (3) not face the sun while shagging. Some courses may have protective devices for a shagger to wear. If such a device is available, the golfer should make sure that the shagger uses it. The golfer who is practicing should also help assure his own safety and that of other practicing golfers. Allowing sufficient room for other players on the practice tee and standing on a straight line with those players already practicing are two important precautions.

On the first tee a player should restrict the number of practice swings he takes and should only take them when it is his turn to play. Since it is necessary to know where the other members of the foursome are standing, whenever a player swings a club, it is helpful if the remaining members of the foursome stand together. If the person shooting is a right-handed golfer, those watching should stand to his right side and behind the ball. A safe distance of 15 feet should be maintained between the person swinging and those watching.

Because distances may be deceiving on an unfamiliar course, the player must make absolutely certain that the group ahead is out of range before hitting. On dog leg or blind holes, extra caution is needed. If possible, a caddy, or one of the foursome, should be sent ahead to check if the way is clear. The caddy should never stand in the fairway to mark the point of aim on such holes, however. This practice is not only unsafe but illegal.

Golfers should play without undue delay. If a group is delayed it should allow those playing behind to play through. Before the group playing through hits, the group ahead should step aside to a protective spot off the fairway. The group playing through should be out of range before play is resumed.

The person with the honor should play first, and only one person should hit at a time. This is one of the most basic rules of etiquette, yet one that is often violated.

A golfer needs to be aware of workers on the course as well as other golfers and caddies. Workers should be warned before a shot is hit in their direction and the golfer should wait for a worker's acknowledgement before hitting.

A golfer must also be aware of the other members of his foursome and not walk ahead of the golfer ready to make a shot. A shank or duck-hook can frequently hurt a playing partner.

Shots from a sand trap near the green can be among the most dangerous shots in the game. Even the most skilled golfers can shank or skull a shot from a trap, thus playing companions and caddies need to protect themselves. When a right-handed golfer hits from a sand trap, the only safe spot on the green is behind and just to the left of the hitter. A ball could be skulled to the area adjacent to the hole and shanked to the area at the right side of the green.

A foursome should leave the green as soon as it putts out, and scores for that hole should be recorded on the next tee. To help ensure speedy play and safety, golfers should leave their golf bags between the green and the next tee.

When using pull-carts, it is particularly important to pull the cart parallel with the green or even toward the next hole before going on the putting surface. Thus, when the foursome putts out they can immediately walk *away* from the green to the carts.

Par three holes present a unique safety problem. On some courses it is suggested that players on the green allow those on the tee to hit so that play may be speeded up. The time saved by this procedure, however, does not seem to be worth the risk. Players on the green may be looking into the sun and not be able to watch the flight of the ball. The color of the sky or an individual's eyesight may make it nearly impossible to spot a ball hit from the tee.

When a ball is traveling toward a player or group of players the word, "fore" should be shouted loudly so that the people endangered are warned. Unfortunately, shouting fore sometimes has the opposite effect of a warning, since many golfers do not know how to react correctly. In an attempt to spot the oncoming ball many golfers look toward the direction of the yell. This exposes a player's face and eyes to the ball. The correct reaction is to turn away from the direction of the sound and lower the head. A player still may be struck, but he is less apt to incur serious injury. If a golfer is near a tree when he hears fore, he should position himself so that the tree is between him and the area from which the ball is coming. Similarly, players should duck behind a golf cart or golf car when possible.

Golfers must learn how to deal with the weather. A hat should be worn to protect a golfer's head from the direct rays of the sun. Golfers should not play during lightning storms. In fact, the Rules of Golf allow a player to interrupt a match when he feels there is personal danger from lightning. He may leave the course without penalty. If on the course when the storm begins, golfers should not carry an umbrella over their heads in an open area. Steel shafted clubs may also attract lightning and must be kept in the golf bag for protection. In fact, it is wise to leave the clubs on the course when getting off the course in a severe lightning storm. If a building is not available for shelter, the golfers should seek natural protection in a depression or a deep valley. A dense group of trees will afford some protection, but isolated trees are to be avoided.

With the increasing use of riding carts throughout the Nation, players should be aware of the safety hazards associated with operating the carts. The player should fully read all directions before using the cart because there are different systems of braking and reverse for each make of cart. Brakes should be set when the cart is left on any type of incline. When moving over rough terrain, carts can bounce and severe injury to the back or spine is a possibility. Thus, the driver should operate the machine slowly. Some carts start and stop abruptly and can jar the passenger. Three-wheel carts can turn particularly sharply and the passenger can be thrown out of the cart. Even though carts have a low center of gravity, there have been frequent accidents with carts tipping over on a steep side hill. Particular care should be taken on hilly courses. Finally, one should keep both feet inside the cart and should not attempt to get into or out of a cart while it is moving.

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Chapter 5

GYMNASTICS

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The popularity of gymnastics and the enthusiasm of physical education teachers, young adults, children and parents in their support of this sport over the past years demand an entirely different approach to accident prevention.

The manufacturers of equipment are aware of the safety requirements of this sport and are continuously in touch with the coaches, educators, and competitors in order to eliminate flaws in safety mechanisms and the construction of the equipment itself.

The coaches must be extremely conscious of the ability of the competitor and the equipment so that the apparatus withstands the forces generated while executing a skill of superior difficulty.

The teachers and coaches must be concerned with teaching spotting and assisting techniques to minimize the always present danger of an accident.

Safety Measures — Equipment

Many accidents occur because of a lack of periodic safety checks of the equipment; neglect in declaring equipment unsafe for use because of damage, cuts, or tears in material, or belated tightening and adjusting of apparatus.

The Mats. Cuts and tears in the surface material of mats occur occasionally during the transport to and from the workout areas. This damage to the mats should be repaired immediately to prevent accidents as well as further damage. Damage to the velcro strips which connect folding mats should receive the same attention.

Continued use of the *crash* or *fat* mat causes structural damage to the consistency of the foam rubber; especially towards the center. The cushioning effect of an old and worn mat is minimal and this presents a hazard to the gymnasts' landings. The foam rubber or the entire mat should be replaced when the mat shows signs of structural changes.

The Parallel bar/Uneven bars. Special attention should be paid to these apparatus in regard to the base, the covering of the legs on the floor, the piston hooks, and the bars themselves.

The floor extensions on this apparatus should be on an even surface and in the case of uneven bars, secured tightly to the floor. Worn or partly damaged rubber pads should be replaced immediately.

Attention must be paid to the landing area. The floor extensions of the bars must be covered and the mats used should fit snugly around the uprights of the apparatus. An even surface is mandatory as well as the covering of the entire area between and around the bars.

The safety locks for the height adjustment of the uprights differ among manufacturers. The coach or teacher should personally inspect this mechanism before and during all workouts and should follow the manufacturers guidelines, especially since gymnasts require this apparatus to be adjusted to their body porportions.

A regular inspection of the bars during workouts is also mandatory. It is possible for the laminated wood to show material fatigue and split. Bars that have lost their resiliency must be replaced immediately.

The Horizontal Bar. Manufacturers have realized that the educator and coach does not only worry about safety but also are concerned with efficiency of use of time. Modern horizontal bars not only provide exciting safety features ranging from the same safety locks for the height adjustment that are found on the parallel and uneven bars to better balancing and safer supporting extensions. When folded for storage, it becomes an ideal compact apparatus, which not only can be set up in a few minutes but also stores in a small area.

The coach again must be concerned with checking this apparatus before and during workouts, to be sure that all locks are fastened and especially turned in the right directions. Students in setting up equipment have been known to *loosen* the locks instead of fastening them by turning them in the wrong direction.

Not all institutions are fortunate enough to have sufficient financial resources to acquire the most modern equipment. Therefore, it is necessary to also mention the high bars with bracing chains or cables.

One of the weak areas of this type of high bar is setting it up with the bracing turnbuckle. The coach must pay attention that the screws on the turnbuckle show enough of their length inside the device. (Figure 1).

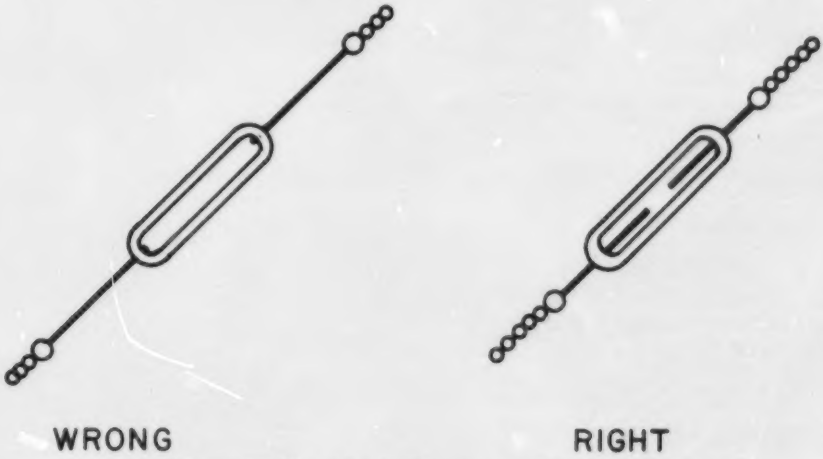

Figure 1: Position of turnbuckle screws should be checked.

The second safety hazard lies with the chain which is attached to the ground hook. The chain links that are not under tension must be loose and should not be in contact with the hook or between the hook and the link under tension. Should a link be in such a position, tension on the bar during workouts could cause the link to slip and a shift in the entire apparatus would result.

The third safety hazard is the base plate of the ground hook. The coach must inspect the screws regularly and also the wood floor. Both could be loose and cause an accident by being ripped out by the force of a gymnastics routine.

Mats must be arranged carefully under the bar so they cover the entire area of possible landings in front and behind the bar. A full width mat with dimensions of 8 feet x 30 feet with a 3½-inch thickness is recommended.

The Horse. This apparatus serves three purposes. It functions as a side horse for women's vaulting and men's pommel side horse routines and as a long horse for men's vaulting.

Many injuries in connection with the men's side horse routine occur because of the base of the horse. Again it must be pointed out that the manufacturers have improved the base by changing from a four-legged base to a two-upright base with four extensions.

The coach still working the four-legged base apparatus must pay special attention to the loop dismounts of the athlete. The coach with the modern base horse must pay attention to the proper placement of the mats to cover the extensions.

The long horse demands special attention at the safety locks of the uprights. Special checks must be made to insure that the collars are in the right position and the locks are fastened. The force exerted on the horse by a vaulter can cause an insufficiently secured upright to give and interfere with the flight and landing of the gymnast.

All of the vaults, side and long horse, are executed with the assistance of a Reuther board. This board is constructed of laminated wood and can show signs of material fatigue, often characterized by the splitting of the wood. The coach must inspect the board for signs of lost resiliency through a weakening of the lamination.

Both the top and bottom surfaces should be covered with non-slip material, if wornout, the surfaces must be redone. A rubber non-slip mat should be used for the approach to the horse.

The Still Rings. This apparatus requires proper adjustment of the rings. Coaches must periodically inspect the material and the suspension. Mats must be long enough to cover the area most probably used for dismounts.

The Trampoline. The trampoline needs immediate replacement of worn out springs or broken plastic links between the spring and the trampoline bed. Several weak springs on one side could influence the rebound and the flight of the gymnast.

Foam rubber pads should cover the metal frame and the floor should have mat covering. This apparatus should meet the recently developed ASTM standard F-381-77 dealing with components, assembly and use of a trampoline.

The Overhead Suspension. Special attention must be given to the overhead rig which holds the spotting belt for the gymnast. Since many manufacturers use plastic hardware (rollers, cushions, washers) wear can make such an apparatus unsafe. The ropes should hang freely so that the coach can assist the performer in case of an unsuccessful stunt. The coach must take care in observing that the individual ropes are not twisted which could cause an uneven tension on the belt and adversely affect the support.

General Safety Measures

The school administrator should honor the requests of the gymnastics coach or physical education teacher to budget for yearly inspection of all equipment by a safety engineer or a representative of a gymnastics equipment manufacturer in addition to complying with all state and local ordinances.

Assisting and Spotting

A distinction should be made between the terms, assisting and spotting. Assisting the activity involves a conscious intervention while the movement is being executed in order to permit the performer to master or simply complete the stunt successfully. Spotting, however, entails catching an individual who is performing a stunt unsuccessfully and is in danger of falling. The

teacher/coach and the student/performer both must know the proper execution of the movement and must be able to envision the entire movement sequence.

The teaching of assisting must concentrate on the various parts or progressions of a stunt or routine in order to permit the student to understand the mechanics of the skill, the critical points during its execution and to learn the right movement for his assist. Breaking down a stunt to its various parts to teach assisting can be considered a methodological tool of teaching gymnastics.

Spotting is much more complex and more difficult. It is that behavior of the teacher/coach or advanced gymnast which permits him to readily spot the performer in case of an unsuccessful attempt to perform a routine which could result in an accident.

The spotter, therefore, must not only know the movements but must also foresee possible danger elements in the routine. He must know beforehand how the performer could fail or even fall and consequently decide on his position in relation to the apparatus and the performer. The spotter is in constant motion and pays attention to every move the performer makes.

Spotting, since it is very difficult, should be the responsibility of the teacher/coach or experienced gymnast. Assisting on the other hand, should be taught to and practiced by every student and gymnast.

Assists. There are two major assists in gymnastics: a) the support assist which is used in activities that call for forward and upward movements; b) the mixed assist grip which is utilized in activities where forward and backward rotation is performed around a horizontal axis. A general overview of these two assists and their application are as follows.

The support assist is applied by the spotter standing facing the performer; with his right hand gripping the right upper arm just below the armpit and with his left hand holding the arm just below the elbow. The right arm is the one that is important in giving support to the gymnast.

Another version is the placement of the right hand of the spotter as above; but holding the wrist of the performer with the left hand. The spotter must be close to the apparatus and the gymnast he assists, in order to be most effective in his support.

This type of assist is mostly applied in vaulting flanks, squats, and straddles across parallel bars, and over the high bar as well as activities on the uneven bars.

Many other assists are necessary for specific activities and just a few are included to illustrate their execution.

The examples are taken from the floor exercise routines: stretch rolls and dive roll. The spotter must be aware of accidents that may happen to the head, neck, spine, and wrist. Unfortunately, due to the velocity of the body mass in motion, the spotter can only concentrate on the neck area and assist the turning gymnast with a protective assist on the head.

The most accident prone area in the handspring is the lumbar section of the spine. The spotter's left hand supports the right shoulder of the gymnast with an underhand grip and the right hand supports the lumbar section.

In the back handspring, the spotter kneels or stands close to the left of the practicing gymnast. He places his right hand on the thoracic area of the back and the other hand with a reverse hold just below the gluteus maximus of the left leg. This provides a secure guidance of the tumbler.

During the front somersault, the spotter concentrates on the neck and head region of the tumbler in order to assist a turning body that lacks height and speed of rotation by accelerating the motion with a sharp push.

The examples given should only illustrate the variety of grips and support assists necessary to guide through an accident-free gymnastics program. They also should illustrate the responsibility that rests on the proper teaching of precautionary methods.

Belt Spotting. Activities on rebound apparatus, floor exercise, and parallel, uneven, and high bars that are of superior difficulty must be taught with the assistance of the safety belt.

The teacher/coach should support the gymnast with this device until the skill is mastered even though the execution may vary slightly. He should consider the gymnast's feeling about his performance and weigh the decision of a beltless performance carefully. Both the teacher/coach and the gymnast should agree on the moment when this skill is to be tried without the belt. A forced early attempt of the skill without the safety belt that is unsuccessful could set the gymnast back several days of training and reduce his confidence in addition to the increased risk of serious injury.

The Performer

Injury prevention must begin with the preparation of the body for workouts. Research over the past few years provides conflicting results concerning the necessity for warm-up sessions.(1)

Gymnastics demand flexibility, agility, coordination, and various additional components of fitness. Certain physiological effects can be derived from warm-ups which appear to be beneficial to competitive performers: e.g. increase of blood supply to muscles; increase in heart rate and stroke volume; increase in blood pressure, increase in body temperature, increase in glycogen conversion, and finally, the stretching of connective tissue allowing for a greater range of motion and speed of movement (2)

Psychologically a warm-up in gymnastics permits the gymnast to get the feeling for the routine; the assurance for success, and ultimately he may achieve a state of relaxation which usually has a calming and soothing effect prior to the performance.

Some of the guidelines for the warm-ups should include considerations concerning muscles to be utilized and duration of the warm-up. This depends on the age and ability of the gymnast, level of performance, the events in the competition and their order, the environmental temperature, and finally, the time of the day.

Approximately 15 to 20 minutes should be set aside for warm-up to prepare the gymnast physically and mentally for a performance. Floor exercise, uneven bars and ring routines are activities where increased warm-ups may prevent some of the frequent injuries.

General Recommendations for Safety in Gymnastics

1. The gymnastics areas should be restricted to gymnastics only.
2. The gymnastics equipment should be used only with qualified supervision.
3. All gymnastics equipment, especially rebound apparatus should be put away properly and locked.
4. The workout schedule should meet the needs and capabilities of the gymnasts.
5. High bar, parallel bars, uneven bars, and rings must be cleaned properly from chalk to prevent wrist injuries.
6. Properly fitted hand guards should be used.
7. Difficult stunts should not be repeated when the gymnasts show signs of fatigue.
8. Warm-ups should be sensible and not include strengthening and fatiguing exercises.
9. The coaches should not attempt to teach skills for which performers do not possess proper knowledge of execution.

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Chapter 6

MARKSMANSHIP

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Competitive shooting, shooting training, or shooting practice carried on in an organized group are among the safest of the sports. Studies conducted by Dzenowagis at Michigan State University revealed that there were no accidents for people participating in shooting and hunter safety in men's physical education activities from 1955 through 1960. (3) Other accident rates run from 1.3 per 1,000 participants for badminton to 26.0 for wrestling. The rate for leisure sports and group games was 6.4. Some elements which contribute to this condition of safety in shooting activities are trained, experienced leadership; the standard disciplines under which these activities take place; and proper range construction.

Leadership

Trained instructors and coaches are essential to the teaching of marksmanship. A knowledge of the standard procedures which are used in conducting shooting and a knowledge of teaching sequences and techniques are required. Instructor training of this type is available through several agencies. The National Rifle Association of America (1600 Rhode Island Avenue, N.W., Washington, D.C. 20036) has listings of instructors and instructor trainers. Instructors are trained through the Outdoor Education Project of the American Association of Health, Physical Education, and Recreation. College and high school ROTC units may also be able to provide instructors or instructor training. In recent years, several universities have included shooting training and training for rifle instructors in the physical education curriculum.

Leadership for competitive shooting activities needs different skills. Referees and tournament officials need a sound background in shooting, including range procedures, and an intimate knowledge of the official rules and tournament operation. The National Rifle Association and athletic conferences and associations sanction shooting competitions. Information on such tournaments is available from the NRA. Schools and colleges frequently obtain this information from their own athletic conference or association.

Disciplines and Procedures

Shooting ranges should be operated with strict adherence to range commands and standard range procedures. The range commands, which are a part of the official shooting rules, are the principal means by which the range officer or instructor maintains complete control of shooting activities. They should be used at the beginning of training and continuously through practice and competitive activities. Standardization enhances safety since the student or competitor deals with a pattern which he understands and can anticipate.

There are some regulations which apply to all ranges, although a special range may necessitate additional local regulations. Gun actions are open and the guns unloaded except

when the shooter is actually on the firing line. Unloaded means that there are no cartridges or shells in the chamber of the gun and none in its magazine. If the magazine is removable it must be out of the gun. If the gun is a revolver, the cylinder must be swung out of the frame. Shooters on the firing line are subject to the command of the person serving as range officer. There is no firing except when the command "*Commence Firing*" is given. "*Cease Fire*" must be obeyed immediately, even if the trigger is partially depressed. The action and the gun should be unloaded at once. No one goes forward of the firing line for any purpose without the express permission of the range officer. When this is allowed, it is only during a "*cease fire*" with all guns on the ground, floor, or bench and with the shooters standing well away from the guns. No one is allowed to touch or handle a gun, even an unloaded one, when another person is downrange. In many ranges it is never necessary for anyone to go forward of the firing line for any purpose except, perhaps, when targets must be changed manually.

Violation of range safety regulations and unwillingness to obey range commands or the direction of the instructor or range officer are ample reasons for dismissal from the range.

Range Construction and Equipment

Indoor rifle ranges involve the same safety considerations as any other room. Beyond that point, the problem of safety is almost entirely one of bullet containment. Bullet containment starts with a bullet stop or backstop. The most common type consists of a steel plate angled at 40 to 45 degrees. The bottom of the plate is away from the shooters. The plate extends the full width of the range and covers a vertical distance of about six feet. Usually the plate extends to the ceiling but, where that is not practical, bullet absorbing material can be placed above it to the ceiling. The bullets are deflected from the plate into a sandpit, 8 to 12 inches deep, built in front of the deflector.

Regular maintenance is required. The life of the plate is long but erosion eventually takes place. Pockmarks should be welded over and ground smooth. Unless special armor plate is used, firing should be restricted to .22 caliber ammunition. The sandpit should be raked periodically to remove accumulations of lead.

If the bullet stop does not cover an entire wall, and there are doors, windows, or other openings in the wall, they must be sealed permanently and covered with steel plate or some other material which maximum ammunition allowed on the range cannot penetrate. Side windows and doors must be given the same treatment. Electrical fixtures, conduit, plumbing, and heating pipes must be protected from penetration by baffling. Ceilings and floors, unless they are concrete or of some other inpenetrable construction, should be reinforced or baffled to prevent bullet penetration.

A definite firing line must be established. A stand should be provided which will enable the range officer or instructor to see all shooters. Rifle racks should be provided so that there is a specific and orderly place to put guns not in use.

Outdoor ranges have the same basic requirements. These ranges must either provide for bullet containment by means of an earth backstop, natural barrier, or suitable overhead baffles or must provide sufficient safety zones to make the baffles unnecessary.

Plans for all types of shooting ranges are available from the National Rifle Association.

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Chapter 7

TRACK AND FIELD

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Track and field is one of the safest and the oldest of sports. The fundamental skills involved in track and field are those that are natural to the childhood of an individual — running, throwing and jumping. During the years following World War II there have been tremendous advances made in the technical knowledge of the sport as well as the techniques of training. However, as usually happens when something advances at so fast a pace, there has not been the same advancement in safety procedures for the sport. As those activities that come naturally to the individual are refined, it is likely that the inherent dangers involved in the activity are disregarded as track and field develops into a very skilled and demanding sport. Many coaches and athletes tend to rush head long into track and field assuming the participation in another sport has prepared the athlete for one of the most demanding sport activities. Preparation is the key to safety and absence of injury in track and field. It is much easier to avoid injury than it is to cure or rehabilitate an injury.

Proper preparation involves the physical, mental and psychological conditioning of the individual athlete and the coach. It is imperative that each athlete have a complete physical examination before being allowed to be a part of the track and field program. The coach should have access to these examination results and be aware of any deficiencies that might require compensation in the training program. The coach should also have a personal history of the athlete including family background, health, hobbies, and personal goals. One of the goals of the training program should be for each athlete to have a picture or knowledge of the whole action of their event. Some of the most easily avoided injuries are those caused by the athlete misunderstanding the proper procedure of the event, (i.e., throwing the javelin instead of pulling it through).

Injury seems to be the most limiting factor in the advancement of participants in track and field. An injury, no matter how minor, has an inhibiting influence on the track and field athlete because there is no way athletes can perform at their best with an injury.

The most common injuries in track and field are usually of a minor nature. Injuries such as blisters, muscular aches, contusions, shin splints, and sprained ankles are the injuries that inhibit the athlete but these are only of minor consequence if attended to and not allowed to get out of hand. The more serious injuries in track and field are the "pulled" muscles and tendonitis in the elbow, shoulder, knee and Achilles areas. These injuries can be serious enough to finish an athlete's career and in most cases could be avoided if the athlete had properly prepared for the event.

Proper preparation involves planning an organized practice period for the athlete. Track and field athletes, regardless of their event, should follow a three-part daily training plan that includes: (1) warm-up (2) instruction and conditioning and (3) warm-down.

Warm-Up

Physiologically, the warm-up is an important part of track and field training. It is frequently neglected or of insufficient duration particularly on days of competition when the athlete feels more acutely the emotional effects of stress. The purpose of the warm-up is to prepare the body physiologically for maximum vigorous activity by gradual loosening of the musculature and stimulation of the circulatory and respiratory systems.

Jogging and slow running of gradually increasing intensity, constitute the major part of the procedure, although each athlete should do some calisthenics with emphasis on those exercises that relate particularly to his/her event.

A proper warm-up is a vital part of the conditioning process and injury prevention for the athlete. Weather conditions, time of the season and the primary event of the athlete must be considered in planning the warm-up.

Acceleration running is also an important part of the warm-up procedure. It consists of several sprints of approximately 110 yards. From a rolling start the runner gradually accelerates for the first 40 yards, runs at ¾ to ⅞ speed for 30 yards and uses the last 40 yards for deceleration. A minimum of 5 × 110 accelerations is necessary, in addition to the jogging and exercises, for a proper warm-up. The maximum amount of accelerated running prior to competition is best determined by experience.

Instructional or Workout Period

This period of training is the core of the daily training activities. The athlete and coaches will be working on form, technique and conditioning during this period. It is important for the athlete to know the reason for his work and how it will help in achieving the goals set by the athlete.

The Warm-Down

Physiologically, the warm-down assists the body in the recovery process. It is also a part of the conditioning program and a preparation of the athlete physically and psychologically for the next workout. Basically a good warm-down is started immediately following the instructional or workout period with 110 yard decelerations. The number of 110's would depend on the intenseness of the workout. As a rule of thumb, you should start the 110's at the same speed you finish your workout, then slow your pace gradually until you are walking and your pulse rate is back to normal. This might require 15 × 110's for a tough workout to 5 × 110 for a light workout.

The warm-down should be a part of every track and field athlete's program. To eliminate the warm-down is the elimination of part of your training program and will prevent you from achieving your goals.

Guidelines For Safety:

Running Events

A. Proper Equipment
   1. Shoes that fit and provide adequate support
   2. Sweat-suit
   3. Loose fitting running suit

B. Warm-up
   1. Jogging
   2. Stretching exercises
   3. Build-up accelerations

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C. Work-out
   1. Volume
   2. Technique
   3. Speed

D. Warm-down
   1. Remove spike shoes and put on flats
   2. Put on sweat suit
   3. Start decelerations and continue until your pulse rate is back to normal and you are dry before showering.

Field Events

A. Proper Equipment
   1. Shoes that fit and protect
   2. Sweat-suit
   3. Loose fitting shorts and t-shirt
   4. Check implement(s)

B. Survey practice area
   1. Check for cross traffic of area
   2. Provide spotters in the throwing area
   3. Do not assume others know you are practicing

C. Warm-up
   1. Jogging
   2. Stretching exercises
   3. Build-up acceleration
   4. Start event work at ¼ speed

D. Work-out
   1. Weight program
   2. Volume throwing or jumping
   3. Technique
   4. Speed

E. Warm-down
   1. Put on sweat-suit and flats
   2. Start decelerations or light jogging for minimum of 20 minutes until you recover your normal pulse rate and are dry before showering.

NOTE: If an athlete receives an injury during a workout it should be reported immediately to the coach or trainer no matter how minor.

Permanent Equipment

Landing platforms (high jump and pole vault) — Athletes should not be allowed to compete in these events if the platforms and approaches do not meet minimum standards as listed in National High School, Junior College and NCAA Track and Field Rule Books.

Jumping pits (long and triple jumps) — Athletes should not be allowed to compete in these events if the pits and runways do not meet minimum standards as listed in National High School, Junior College and NCAA Rule Books.

Throwing events (javelin, shot-put, discus, hammer) — Athletes should not be allowed to compete in these events if the sectors, circles, protective cages and runways do not meet minimum standards as listed in National High School, Junior College and NCAA Rule Books.

Competition Control:

The problem of restricting, for health reasons, the number of events and the length of the running events for competitors in track below the college level and for females of all ages, has been a moot question. Many states have restricted high school competitors to one running event above the 220 yard dash and one competitor to three events. Some have limited the length of distance running to one mile on the track and to two miles cross-country.

There appears to be little or no scientific support for any of these restrictions. Most physiologists, sports medicine experts, and reputable coaches believe that no harm can come to the hearts of youngsters through strenuous participation provided there is no disease and the training program is well planned and carried out. In fact there is a general acceptance of the theory that only cardiovascular development through endurance exercise is the type of training that will lengthen life if adhered to throughout the life span.

The emergance of thousands of youngsters in swimming and track and their dominance in so many events would dispel most of our antiquated concepts of needed restrictions. (3:135-36)

Meet Controls:

All track and field competitions should be held under the auspices of the related national, state or local organization. This provides a common set of rules and a rule book to which all participating athletes and coaches will have access. The actual control of the meet is dependent on the officials. A qualified official is a prime deterent to injury for athlete and spectator alike. The United States Track and Field Federation has published a track official's manual that should be required reading for all meet officials. (6) The USTFF also has a certifying program for track officials that includes an examination of the rules of the sport as well as proper procedures for conduct of the events.

Implications of Liability:

The responsibility for liability can be determined only in the courts of law. However, anyone that assumes the leadership in working with youngsters should recognize certain prerequisites that would reduce opportunities for injury to the participant. A partial list of prerequisites are as follows:

1. Physical examination and parental consent.
2. Qualified supervision of workouts and competition.
3. Equipment meeting minimum safety standards.
4. Qualified medical and/or first aid treatment available.
5. Insurance provided or made available to participants.

Track and field is one sport that has something for all ages and both sexes. There need not be competition for an individual to gain from participation in the oldest of all sports. Health, self satisfaction, companionship and just downright enjoyment are but a few of the plus items involved in track and field.

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Chapter 8

WEIGHT TRAINING AND WEIGHT LIFTING

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The attainment of strength is an important objective of physical fitness. It is achieved by a gradual increase of a load to a working muscle over a period of time, usually several weeks. After the exercised muscle adjusts to the initial load, more weight can be added. This method of gradually adding a weight load efficiently and in small dosages is frequently referred to as weight training and weight lifting. The distinction between the two terms is based upon the desired objective. *Weight training* is performed to increase strength and general physical appearance. *Weight lifting* is a competitive sport involving the two Olympic lifts, the snatch, and clean and jerk. The objective in weightlifting is to raise overhead in a prescribed manner as much weight as possilbe on a barbell. In both weight training and weight lifting, the same precautions must be taken to assure safety.

Prevention of Injuries

Several factors should be considered to assure safety while lifting.

1. Thorough physical examinations should be required in order to discover any cardiac, abdominal or other weaknesses that might be aggravated by exercises which develop abdominal pressure or tension in the thoracic or abdominal cavities.

2. Sufficient warm-up should be taken before lifting. Physiological changes in the muscles occur from activity performed with relatively light resistance. These changes prepare the muscular system for more strenuous activity. Consequently, it is expected that a warm-up will reduce the probability of muscular injury.

3. Training programs should be based on proven physiological and kinesiological principles to avoid over-training and injury. Competent teaching is necessary to gain optimal results and to eliminate possible deleterious effects from training. To avoid soreness, it is important that the muscles gradually adjust to the work load. The lifts should be performed correctly to prevent undue strain on the skeletal joints.

4. The provision of a suitable area is important for the conduct of a safe program, since the frequency of accidents may increase as exercise space is reduced. Several areas each 10 feet square should be marked off in the gym for training, and only the lifter and spotters should be permitted in these areas. Congestion in the lifting area may result in injury to the lifter and other students if a barbell is unbalanced or dropped.

5. Whenever necessary, spotters should be employed to prevent injury while lifting. Lifts such as the overhead press or jerk, the bench press, and the deep knee bend should always be performed with a spotter on each side of the lifter. In fact, spotters should be used whenever any relatively heavy weight is balanced over the body. However, when training young children it is necessary to have one or two spotters for *every* lift. Organization of instructional classes into

groups of three or four individuals each of about the same body weight is recommended. These groups work together thus provision is made for spotters. Such organization is particularly important when heavy weights are lifted.

6. Collars on barbells and dumbbells should always be firmly secured. It frequently occurs in training that a barbell or dumbbell is not perfectly horizontal to the ground. Consequently, there is a tendency for the plates to slide off the bar and possibly injure the student and/or spotters. To prevent this, the collars securing the plates on the bar should be tight.

7. The determination of the proper amount of weight to be lifted in each exercise, the number of repetitions and sets, and the precise time when additional weights should be added require adequate and careful supervision.

8. All weight training apparatus and equipment should be well-constructed, well-maintained and thoroughly inspected regularly for unsafe features.

Following these safety rules will allow the student to benefit from this wholesome activity without an unnecessary risk of injury.

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Chapter 9

FENCING

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Despite its lethal ancestry, modern fencing must rank among the safest of sports. While no figures are available, the accident and injury rate has always been low due in large measure to both the quality of the protective equipment worn by fencers and the enforcement of safety rules by most teachers and coaches. It is rather common for an entire major competition to be run without injury to any fencers, officials, or spectators.

Perhaps the greatest danger is to the self-taught fencer using inadequate protective clothing. Generally speaking, injuries become less frequent as the quality of fencing improves because competitive fencers are expected to wear full protective uniforms in adherence to strict guidelines in the rules book.

Physical Education

Minimal equipment for physical education class fencers includes a half-jacket, a mask, a foil, and a glove. Jackets for women usually have heavier padding and include pockets for the optional insertion of additional protection. All jackets deteriorate with time and laundering and must be inspected from time to time for defects.

Masks must be free of rust or weak spots which might allow penetration by a broken foil blade. Mask bibs serve to protect the neck and must be in sound condition.

New foil blades require shaping before being put into use. A slight downward bend should be worked into the first third of the tip end by drawing the blade between the floor and the shoe while lifting the tang end slightly. This bend helps to absorb the shock of a touch whereas a straight blade tends to transmit the force of the touch to both the target partner, and in the opposite direction, to the fencer's hand.

It is very important that the foil tip be covered with either a commercial plastic tip or with a few layers of adhesive tape. Such a covering will reduce the chances of scratches from the exposed, though blunt, foil tip. It also serves as a visual assurance to the fencers that the blade is not broken.

A safe fencing area has a floor with good traction and no obstructions and is large enough to permit sufficient spacing of each pair of fencers and to allow room for the instructor to walk between pairs without danger to himself.

Perhaps it is needless to state, but the teacher or other qualified supervisor must always be present whenever students are practicing or fencing. There is always potential for injury in a sport such as fencing, but this can be minimized by controlling horseplay and overseeing practice. Administrators would be well-advised to observe any new teacher assigned to teach a fencing class so as to assure themselves that safety practices are being taught and followed.

Among the more important safety principles that must be taught to all students are the following:

1. Both partners must wear masks whenever any foil drill, no matter how simple, is being practiced.

2. Whenever it is not in use, the foil should be carried handle end down with the blade held close to the arm. It may be rested on the floor with the hilt down and the blade grasped by the hand.

3. A broken blade cannot be taped and continued in use. It must be replaced.

4. Adequate protective equipment must be worn.

5. The student should learn to put on and take off his mask with only the unarmed hand. If it seems necessary to use two hands, the foil should be put down so that its tip presents no hazard to the eyes of anyone in range.

6. Students who do not have control of their blades or body movements should not be allowed to fence with others until the fundamentals are better developed. A strong, aggressive fencer with no control is a menace to his partner.

7. Beginning classes should be taught to attack and defend only the high target area because this is the area where most touches are made anyway and because inclusion of the low target would require students to wear trousers and groin protection.

8. Because of the heat retaining characteristics of the canvas jacket and mask, drills must be moderated on hot days and frequent rest periods provided.

Athletics

The competitive fencer needs more protection than does the physical education student. The rules require the wearing of a full jacket, fencing trousers, mask, glove, and an underarm protector. In addition, women should wear breast protectors and men should wear cup supporters.

An epee blade is considerably stiffer than a foil blade, and therefore the epeeist usually wears a jacket made of a heavier material than is needed for foil. With more women now participating in epee and sabre fencing, their teachers must be aware of the need for better protection.

Broken blades constitute the greatest single hazard, and even the best quality uniforms or masks can be penetrated. For this reason, all fencers should be taught to relax the elbow as a touch is made so as to reduce the possibilities of blade breakage. Each blade is different and there is no way to predict if or when it might break. Most often, the user is at fault in his style. Sometimes the opponent makes an unexpected forward movement as the attack starts and this movement of opponents towards each other may cause a blade to snap. Finally, there may be a flaw in the blade that cannot be detected by visual inspection.

Since many more touches are given and received in a normal practice session than in a team competition, the fencers should have practice uniforms and weapons that are at least comparable in quality to meet uniforms. It is a dangerous practice to use worn out equipment for workouts so as to save the better uniforms for meets. The frequency of touches made in practice is somewhat offset by the fact that teammates usually know what to expect of one another whereas in a meet, a fencer is under pressure to win and may be less conscious of his safety.

Presently there are no well-defined standards for uniform fabric strength, weave, or durability. The following general requirements for clothing and equipment are from Rule 27 of the official rules book:

1. The equipment and clothing of the fencer must assure the maximum protection compatible with the freedom of movement essential to fencing.

2. It must not, in any way, risk interfering with or injuring the opponent; neither may it include any buckle or opening that might, except accidentally, catch the opponent's point and thus hold or deflect it.

3. All garments must be white. They must be made of sufficiently strong material and be in good condition. The material used for equipment shall not present a slippery surface capable of

making the point, the button, or an opponent's cut glance off; the judging of touches shall be facilitated as much as possible.

4. In foil and sabre, the bottom of the jacket must overlap the trousers by at least 10 cm when the fencer is on guard.

In epee the fencer must wear a regulation jacket covering the entire surface of the trunk.

In all weapons the wearing of a protective undergarment is mandatory. The jacket and the collar must be completely closed and buttoned.

Women's equipment, in addition, must include in the jacket a breast protector of metal or some other rigid material.

5. The trousers (knickers) must be fastened below the knees. If the fencer wears long trousers, the bottoms shall either be buttoned or fastened above the feet. With knickers, the wearing of a pair of white stockings is mandatory. They must cover the leg entirely up to the knickers and be fastened so that they cannot fall down.

6. In all weapons the cuff of the glove must always entirely cover the lower half of the forearm of the fencer's sword arm to prevent an opponent's blade from entering the sleeve of the jacket.

7. The mask must be formed of mesh wherein the openings between the wires are at most 2.1 millimeters and of which the wires are of a minimum diameter of 1 mm before tinning, which should be carried out by a hot process after the mask has been shaped.

In foil, the mesh of the mask must be insulated inside and out. The bib and trim must be white.

Officiating

The rules forbidding brutal hitting and unnecessary roughness are clear and should always be enforced by the officials. A meet director has full authority to act to prevent injury that might be caused by the method of fencing or by improper equipment.

Officials are also subject to injury if the fencing strips are not sufficiently spaced to allow directors and judges to stand well away from the competitors. Meet organizers should consider this when selecting a site. Officials may bump into or trip over scoring tables, reels, or various cords used in electrical meets.

Spectators, scorers, and officials could be struck by the flying end of a broken blade. Everyone not involved in the bout should stand some distance from the strip to lessen this danger. Officials standing too close to a strip may be struck in the face by a wild parry.

Summary

Fencing is safe, but it is only as safe as teachers, coaches, officials, and fencers make it. No horseplay should be permitted. Equipment and facilities must be suitable. Most beginners instinctively sense the potential dangers involved in fencing and exercise good common sense in protecting themselves and their partners, but for those few who do not, supervision must be provided. Good teaching cannot be limited to technique instruction but must cover all aspects of safety.

Rules which govern fencing come from the Federation Internationale d'Escrime and the Amateur Fencers League of America. These rules are slightly modified for intercollegiate competition by the National Collegiate Athletic Association.

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Chapter 10

BADMINTON, HANDBALL, RACQUETBALL, PADDLEBALL, SQUASH RACQUETS, AND TENNIS

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BADMINTON

When played well, badminton demands a great deal of speed, flexibility, endurance, and agility. These qualities rarely result in injuries.

Hazards

1. A player might run into his doubles partner.
2. A player might be hit by his partner's racquet.
3. If both players are close to the net, one might receive a slash from his opponent's racquet.
4. Eye glasses might be broken by a doubles partner.
5. Pulled tendons and inflamed elbow joints might result from play.
6. A player might run into net posts or other objects near the court, such as benches, walls, water fountains, or gym equipment.

Avoidance of Hazards

1. Remove all obstacles near the courts.
2. Have the players warm-up before playing.
3. Instruct the players on how to get out of the way of their partners.
4. Conduct a good conditioning program with emphasis on stretching muscles and joints.

HANDBALL

Handball is not considered to be a highly hazardous game. However, the smaller the courts, the higher the incidence of injuries.

Hazards

1. A returned ball striking a person can cause serious as well as slight injury, depending upon the part of the body struck. A ball hitting a fleshy part of the body usually causes a bruise. A hit to the face, especially to the temple or eye, can cause serious injury.
2. If, in the act of hitting the ball, the striker catches his arm on the body of an opponent or partner, severe damage can be done to the musculature of his shoulder joint.
3. Persons attempting to hit a ball close to a wall often jam their fingers. Bone breaks may also occur.
4. Players often run into a wall when trying to reach a ball, which can result in dislocations, contusions, or broken bones.
5. Overexertion, especially by older persons, may lead to heart attacks.

Avoidance of Hazards

1. Remove all projections, such as door knobs, from the insides of the courts.
2. Keep the floors of the courts dusted and skid-proof.
3. Have good lighting.
4. Stress conditioning as a safety measure.
5. Have the players turn their faces away from the back of the court to avoid being hit on the side or front of the head by a returned ball.
6. Do not deliberately hit an opponent with the ball to get a hinder.
7. Instruction in strategy and safety techniques is important.
8. A program of conditioning which includes distance running, sprints, quick starting and stopping, dodging, twisting, and stretching is necessary to prepare a person for play.
9. Persons should not play to the point of exhaustion, especially if they are unconditioned or over 40 years of age.
4. Padded gloves will help prevent bruises of the hands. The gloves should be worn at all times by persons who are just beginning a season or who have not played for a long period of time. Sometimes soaking the hands in hot water for about five minutes before play will help reduce hand bruises.
11. Interchange of gloves may result in the passing of fungi from one person to another.
12. Hinders should be called whenever there is a possibility of injuring a player or of self-injury.
13. The use of protective eye goggles or a mask is recommended during play.

SQUASH RACQUETS

Accidents in squash that result in injury seem to increase as the size of the courts and caliber of play decrease.

Hazards

1. Almost all injuries are due to the victim being hit by a racquet swung by his opponent.
2. More cuts and bruises come from the follow-through swing than the forward swing.
3. Lacerations and contusions about the face and head are common.

Avoidance of Hazards

1. Watch out for yourself and other players.
2. If in doubt, don't swing; ask for a let.
3. If possible, allow the ball to get low before you hit it so your racquet will be low.
4. Take a small, low backswing and follow through with a small "checked" low motion.
5. As soon as you have hit the ball, get out of the way at once.
6. Technique: if an open faced swing (racquet face tipped back a little) is used, a high follow-through is unnecessary, and you won't hurt people; if you hit someone, it will be on the leg, not on the face.
7. Good instruction is necessary.

Other Suggestions on Avoiding Injuries

Conditioning. Poor physical conditioning seems to increase the potential for hazards. Exercise for increasing strength, endurance, and flexibility may be used in a conditioning program. Middle distance runs and sprints should be added to the work needed to condition a squash player thoroughly.

Officiating. Officials are usually provided in championship or intercollegiate matches. The referee should be generous in allowing a let whenever there is a question of unnecessary interference by a player when his opponent is playing a point and when there is unnecessary crowding. The referee must also call a halt to play if a person is injured.

Facilities and equipment. When courts are constructed, the advice of experts should be sought to insure that the wall and floor surfaces are suitable and that enough foot candles of light are provided. Good ventilation is needed so that the players will receive plenty of cool air. No projections of any kind should exist within the court.

Coaching. Most hazards can be removed by a sound program of instruction. In short, a squash coach or teacher must have had a great deal of experience as a player. The art of squash playing is too technical to be taught by anyone not well versed in the game. Instruction is extremely important for beginners, who must be made aware of the game's dangers.

Medical supervision. Medical supervision cannot be provided in all schools where squash is played, but a first aid station should be located close to the courts.

PADDLEBALL OR RACQUETBALL

Paddleball or racquetball is a very hazardous game because of the danger of being hit by a paddle or racquet; serious injuries to the face and head have happened in game play.

Hazards

1. A player might be hit by a paddle or racquet.
2. A player might run into the court walls.
3. Strained or torn muscles or cramps might result from play.
4. A player might suffer from overexertion.

Avoidance of Hazards

1. A player must always be aware of the position of his partner or opponent.
2. The stroke follow-through should be short and toward the front wall.
3. A player must not hesitate to call a hinder when there is danger of hitting another player with a paddle and/or racquet.
4. There should be wrist thongs attached to all paddles or racquets and the thong *must* be secured around the wrist.
5. Players should watch the play off the back wall. Failure to do so may result in another person running into or hitting the player with the paddle and/or racquet.
6. A good conditioning program of running and exercises should minimize the incidence of pulled or torn muscles and cramps.
7. Care should be exercised to prevent oneself from running into a wall.

TENNIS

Tennis involves few accidents. The nature of the game classifies it as a noncontact sport.

Hazards

1. Most people think tennis requires little conditioning and so strained muscles, pulled tendons, cramps, and inflammation of the elbow joints are common types of injuries.
2. Falls resulting in abrasions and contusions can occur if the playing surface is slippery.

Avoidance of Hazards

1. Conditioning programs are necessary.
2. Safe court surfaces should be provided.
3. Crowding at hitting boards should be avoided.
4. Instruction in hitting techniques and court strategy is necessary.

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Consultants

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Chapter 11

JUDO

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The development of Judo in the United States can be attributed in part to the work of the qualified Judo instructors and their methods of training and discipline. Through their efforts, Judo has become a safe and enjoyable sport for the young and old of both sexes. The first Americans were introduced to Judo many years ago. (3) The official date given for the start of the Kodokan is 1882, established by its founder, Dr. Jigoro Kano. (6) However, President Ulysses S. Grant, while in Japan on a state visit in 1879, observed a demonstration of Judo techniques by Jigoro Kano. The first American to study Judo seriously was Professor Ladd of Yale University in 1889. The famous educator Dr. John Dewey, Professor at Columbia University, and his wife Alice visited Japan in 1919 and saw a Judo exhibition given by Jigoro Kano. The following excerpt is from a letter written by John Dewey on April 1, 1919.

> "My other experience that I have not written about is seeing Judo. The great Judo expert is president of a normal school, and has arranged a special exhibition by experts for my benefit, he explaining the theory of each part of it in advance. It took place Sunday morning in a big Judo Hall, and there were lots of couples doing "free" work too; they are too quick for my eye in that to see anything but persons suddenly thrown over somebody's back and flopped down to the ground. It is really an art. The professor took the old practices and studied them, worked out their mechanical principles and then devised a graded scientific set of exercises. The system is really not a lot of tricks, but is based on the elementary laws of mechanics, a study of the equilibrium of the human body, the ways in which it is disturbed, how to recover your own and take advantage of the shiftings of the center of gravity of the other person. The first thing that is taught is how to fall down without being hurt, that done is worth the price of admission and ought to be taught in all our gyms. It isn't a good substitute for out-of-door games, but I think it is much better than most of our inside formal gymnastics. The mental element is much stronger. (2:5-6)

The first man to teach Judo in the United States was Professor Yoshiaki Yamashita, a disciple of Jigoro Kano. He was invited by Mr. Graham Hill, the director of the Great Northern Railroad in 1902. He and his wife, who also taught Judo, stayed in the United States for 7 years, teaching at Harvard University, the U.S. Naval Academy and the White House. Among his many distinguished students were President Theodore Roosevelt, his son, and also the grandson of Robert E. Lee.

In the United States, until after World War II, Judo was practiced, for the most part, by the second generation Japanese (Nisei) on the West Coast and in Hawaii. It was mainly through the efforts of General Le May and later General Powers of the Strategic Air Command and Dr. Henry Stone of the University of California at Berkeley, that Judo really received an impetus for its growth and development. Through the cooperation of the AAU (Amateur Athletic Union) and the agreement between the AAU and the United States Judo Federation, the technical body for Judo, Judo in the United States has reached its present stage. (4, 8) In addition, the USJF Interscholastic Committee and the Eastern and National Collegiate Judo

Associations have added enthusiasts who participate actively. The numbers who practice Judo are estimated to be about one half million. Further growth of Judo has been limited only by the lack of qualified trained instructors.

Judo, being a contact sport, introduces problems of accidents and injuries. In contrast to Jujitsu, and other forms of unarmed defense, it is a competitive sport regulated by rules.

The Medical Committee of the United States Judo Federation (USJF) has kept a record of major accidents and injuries in Judo since November, 1961. To date, 287 such injuries have been reported (7). (See Table I)

TABLE I
TYPES OF INJURIES IN JUDO[a]

Fractures: (98 total)			
Clavicle	34	Knee	1
Clavicle & Scapula	1	Tibia	4
Humerus	3	Fibula	5
Elbow	3	Bimalleolar	3
Medial Epicondyle	4	Ankle	2
Forearm	12	Foot	3
Wrist	6	Toe	9
Finger	3	Maxilla	1
Rib	1	Nose	1
Shoulder Injuries: (48 total)			
Dislocations (Gleno-humeral)	21	Sprains	10
Separations (Coraco-acromial)	17		
Dislocations: (68 total)			
Thumb	4	Costo-sternal	1
Elbow	26	Acromio-clavicular	30
Sterno-clavicular	5	Ankle	1
Jaw	1		
Compound Dislocations: (3 total)			
Toe	2	Finger	1
Knee Injuries: (15 total)			
Torn Cartilage	2	Knee Sprain	5
Torn Ligaments	8		
Severe Contusion of muscle: (7 total)			
Neck	1	Back	1
Shoulder	1	Elbow	1
Deltoid	2	Trapezius	1
Miscellaneous: (48 total)			
Concussion	27	Severed Tendon, Achilles	1
Cervical Sprain	2	Torn Ligaments of Ankle	2
Contusion Scrotum	1	1st & 2nd Degree Burns	3
Ext. Tear Aponeurosis, Hand	1	Torn Rib Cartilage	7
Contusion Elbow	1	Cervical Fx. with Hemiparalysis	2
Pneumothorax	1		
Total Injuries — 287			

[a] Report to the USJF Medical Committee since the survey started November 30, 1961.

In the 287 major injuries reported, two-thirds occurred during competition and the other one-third during the teaching phase and free exercise (Randori). As in any contact sport, certain types of injuries are expected, such as abrasions, bruises, hematomas, minor contusions, and sprains. (9) Only the cases which were considered important and serious enough to be reported are included in this survey.

In analyzing these statistics, one must be familiar with the rules of contest and the various techniques used in winning; e.g. throwing techniques, mat techniques and submission holds such as choking and elbow locks. (4, 8) The throwing techniques known as nagewaza can be divided into two basic types: 1) from the standing position (tachi-waza), 2) from the lying position or sacrificing form (sutemi-waza). There are various mat techniques (katame-waza or ne-waza, osaekomi-waza) where the opponent is held down, and controlled for 30 seconds which enables the tori (the holder) to win. Choking (shime-waza), joint locks (kansetsu-waza) are allowed as submission holds.

In the analysis of the injury statistics, the following causes of accidents could be classified in separate categories: (See Table 2)

Of the 287 cases reported, 208 had some indication of the possible cause of the injury. In some cases, a combination of the factors led to the mishap.

Based upon the above findings, the following recommendations can be made to decrease the number of injuries.

Qualified Instructors

The instructor must be thoroughly familiar with the rules and regulations, the possible causes of injuries, and be prepared to apply first aid especially in reviving those who have been "choked out." He must emphasize the fact that learning to fall (ukemi) is more important than learning to throw. Falling is the first line of defense. (5) In the beginning, the novice must learn to fall in all directions, forward, backward, and sideward. The instructor must be able to convey to the student that the force of the throw augments the force of gravity.

In the United States all qualified instructors are certified and registered with the United States Judo Federation (USJF). (10)

Before a black belt instructor is hired, his credentials should be checked to avoid possible liability due to injuries.

The instructor should emphasize the importance of:

A. The Proper Throwing Techniques (Nage-waza)
   1. To tuck the sleeve of the uke (the one who is thrown) just before he lands so he will not hit his head and to enable him to land on his shoulder and side in the proper manner.
   2. Not to drive the uke into the mat; this will allow the uke to ukemi properly.
   3. Not to fall on the uke.
   4. Not to force a throw or complete a throw when there is impending danger (e.g. throwing when the opponent's foot is caught between the mats)
   5. Not to use certain types of throws, e.g. Maki-komi-goshi (wrapping hip throw) against certain individuals (opponents with small frail body structures). Certain style of Uchimata which causes the tori to twist his own neck while throwing the opponent.

B. The Proper Falling Techniques (ukemi)
   1. The uke must break the habit of extending the hand or arm to brace himself for the fall. The impact of the fall can cause fractures of the wrist, forearm, and dislocation of the elbow. The real danger is the additional force caused by the tori (the thrower) falling on top of the uke.
   2. The uke must learn to tuck in his shoulder and head so that the impact of the fall is distributed to his back and side rather than directly on the point of the shoulder.

TABLE 2

THE CAUSES OF JUDO INJURIES

	Number	Subtotal	Total
Improper Throwing Techniques			58
Driving the uke into the mat:		23	
Concussion	8		
Shoulder separations	9		
Fracture of clavicle	2		
Miscellaneous	4		
Following uke to the mat for osaekomi		4	
Falling on top of uke		15	
Twisting own neck on throwing		2	
Miscellaneous		14	
Improper Falling Techniques:			84
Reaching out with arm and hand extended		35	
Dislocation of the elbow	16		
Torn muscles of the elbow	2		
Fracture of wrist	4		
Fracture of forearm	11		
Fracture of elbow	2		
Falling on the shoulder		30	
Shoulder separation	15		
Fracture of clavicle	15		
Holding on to tori		4	
Miscellaneous		15	
Improper Playing Surface			13
Twist ankle	4		
Twist and fracture tibia	4		
Dislocate toe	5		
Aborted Throws			15
Caught in judogi	6		
Shoulder separation twisting out of throw	3		
Miscellaneous	6		
Recurrence of Old and Recent Injuries			10
Mat Techniques (katame-waza)			5
Miscellaneous			23
Total Number of Injuries			208

3. The uke should release his hold on the tori when he is being thrown. This prevents the tori from falling on top of the uke.
4. The uke should fall properly whenever he is thrown. However, when a match is at stake, the uke often attempts to abort the throw by twisting and spinning in the air to avoid losing the match. Such maneuvers introduce injuries.

C. The Proper Choking Holds (shime-waza)

1. In order for choking holds to be effective, the tori must first control the uke's body before applying the pressure on the vulnerable area of the neck.

2. At no time is pressure to be applied across or on the face.
3. The tori must release the hold as soon as the uke becomes unconscious.
4. The choke hold is not to be applied unless some higher rank judoist, who knows the resuscitation method (Katsu), is present.

D. Elbow Locks (kansetus-waza)
1. The elbow joint is the only joint allowed to be locked.
2. The tori must release the hold as soon as the uke signals or calls submission.
3. The uke should not be too stubborn to signal and concede the match.
4. The referee must stop the tori and signal victory before the force of the lock causes damage to the elbow joint.

E. Mat Techniques (osaekomi-waza)
1. In mat techniques undue force, illegal maneuvers such as wrenching the neck, kicking, biting, hitting, and pressure on the face can lead to serious injuries and complications. Therefore, all these maneuvers must be prohibited.

The Competition Area

A. The competition area should be kept smooth, firm, clean, cool, and free from cracks or openings. If tatamis (straw mats) are being used, they should be on a wooden floor or platform. If foam mats (e.g. ensolite) are used they should be covered with tight canvas. If gym mats are used, they should be fitted as closely as possible and covered by a tight canvas.

B. The competition area must be adequate: minimum of 20 ft. × 20 ft., preferable, 30 ft. × 30 ft. There should be mat material around the outside of the contest area of not less than 3 feet. If the competition area is elevated, safety measures must be taken.

C. Not only the officials, the referee and the judges, but also the individual players should be aware of improper playing conditions, e.g. a separation of mats under a canvas cover, or between tatami are often not easily recognized by an observer outside the competition area.

Aborted Throws

A. The judogi (the costume worn by judoists) simulates the ordinary jacket and pants worn by most men and is used to prevent bruises and, most important, mat burns. However, they may also contribute toward injury. For example, hands or fingers may be entangled and caught in the judogi during a throw. In randori (free exercise) the tori should not complete his throw when he realizes the uke is caught in his own judogi. On the other hand, if the tori is caught in his own judogi, the uke should do ukemi without resisting the throw.

B. In aborting the tori's throw, there are certain rules that prevent the uke from using such maneuvers as reaping the tori's leg from inside his legs while holding the tori from behind. Such a maneuver can cause serious knee and leg injuries.

Recurrent Injuries

In the USJF survey, ten injuries were recurrent. The danger of returning to active randori and competition too soon is quite apparent. Even physicians may disagree as to the athlete's readiness for active participation. The safest measure is to follow the direction and the advice of the physician taking care of the patient. Regardless of how trivial or minor the injury may seem to the judoist, sometimes its complications may lead to catastrophe or permanent injury.

As a rule the tests to determine whether a judoist after injury is in condition to return to judo are: first, to determine whether he can do ukemi (breakfall) on his own without pain or

discomfort and, second, to determine whether he is able to do uchikomi (form fitting of the throw with an opponent without throwing) without pain or discomfort. Finally, determine his ability to do randori at an easy pace (with the full knowledge by the opponent that he had a certain injury) without pain or discomfort. Here again, the decision to return to active competition depends on the skill, experience, and the age of the judoist, along with the advice of his experienced instructor, coach, and, most important, his physician.

All judoists should have a complete physical once a year, especially those who are in active competition. In every tournament a physician should be present.

Summary

In the United States there are over 500,000 active participants in judo. Its growth has been most noticeable in the AAU, the high schools, colleges, and the universities. Based on the survey of major accidents and injuries in judo reported by the Medical Committee of the United States Judo Federation, the previous recommendations for safety were made.

Although 287 injuries were reported in the span of 14 years, the records show that judo is a relatively safe sport. If the safety precautions are followed, the number of injuries should decrease in spite of the growth of judo activities.

As in every sport, all participants must know the rules and regulations, the legal and illegal maneuvers, and holds and throws. The instructors, the referees, and judges must make sure that the rules and regulations are strictly enforced. (1)

The large number of participants, young and old, male and female, give further proof that judo is a safe, enjoyable, sport when properly supervised.

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Chapter 12

WRESTLING

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Participation in vigorous and competitive physical activity is not without some measured risk of injury. As would be expected of a contact sport, wrestling results in a higher incidence of injury than other milder forms of athletics. Studies conducted during the last decade have revealed that wrestling ranks among the top five in the number of incidents of injuries compared to other competitive sports on the high school level.

Common wrestling injuries include sprains, strains, contusions; and occasionally, concussions, dislocations, and fractures. A recent six-year study of wrestling injuries at Boston University resulted in the following frequencies of injuries.

Sprains — 36%
Contusions — 28%
Strains — 23%
Dislocations — 5%
Fractures — 5%
Concussions — 3%

It should be pointed out that there have been many findings which are contradictory in nature concerning the incidence of injuries in wrestling. Lloyd, Deaver and Eastwood (3) reported in 1939 that wrestling ranked fifth in the incidence of injuries among high school sports and third among colleges. Several other studies conducted by Konrad, (2), Patacsil, (4) and Reek (5) have shown more recently an injury ratio of 5 to 10 percent while one high school study showed an incidence of 33.65 per 100 participants. (1)

Reek (5) found that approximately 5 percent of the total high school squad received injuries; the average accident rate per school was 1.9; the average days lost per school year was 13.5; and the average severity rate per accident was seven days.

According to many experts in the field, a good percentage of the injuries are a result of the poor conditions under which a program is conducted. Physical examinations, proper equipment, facilities, warm-up, conditioning programs, pre-practice supervision, and competent coaching and officiating are among the factors which should be carefully considered in an attempt to provide safe conditions for competitive wrestling.

Physical Examinations

An individual should not be allowed to practice or compete until he has been given a thorough examination by a physician. Furthermore, a competitor should not be allowed to participate after an injury or illness until he has been re-examined by a doctor. The weight reduction program of wrestlers should also be prescribed by a medical doctor through consultation with the coach, parent, and athlete. In addition, qualified trainers should be available

during practices and meets to attend to injuries that occur. Sprains, strains, and contusions are the most common. However, concussions, fractures and dislocations occasionally result and need the attention of a physician.

Facilities and Equipment

The Room. A wrestling room should be well-padded, clean, well-lit, and properly ventilated. Mats should be purchased from reputable companies that provide high quality mats. The vinyl laminated foam mats provide a tough and durable mat that is extremely resistant to gouging and scuffing. These mats also come with an anti-bacterial additive in the paint which guards against infection and fungus. Furthermore, the foam type mats provide an excellent shock absorbent quality to reduce the impact of falls. It is also advisable to install a 6-inch plywood base floor under the floor mat to help absorb shock.

The wrestling room should be heated to a temperature between 70-80 degrees. Cold rooms will result in muscle injuries and excessively hot rooms will produce fatigue and exhaustion resulting in injury. Proper ventilation and circulation of air is an important consideration. In addition, a bright well-lit room adds to the atmosphere of a wrestling area. (See Figure 1)

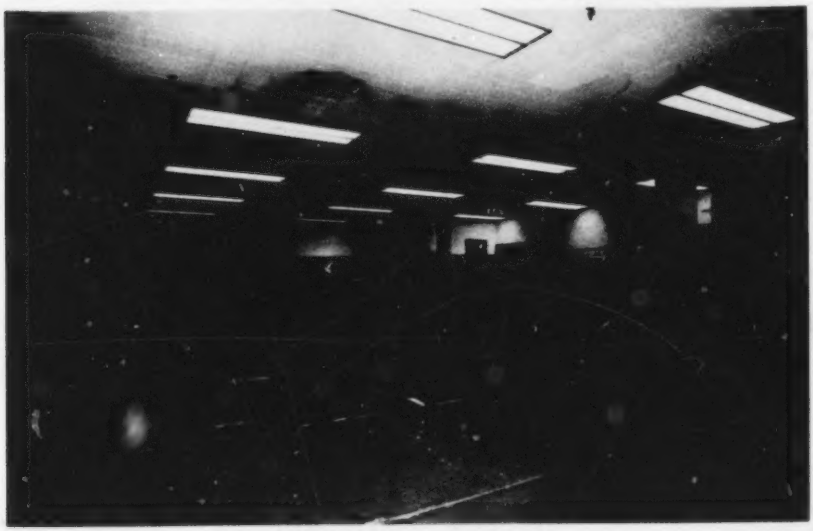

Figure 1: Safe wrestling room.

Mats. Mats should be placed wall to wall on the floor and to a minimum height of 5 feet on all walls or posts in the room. When using open mats, be sure that the mats are joined tightly with mat tape. More importantly, boundary mats should be provided for the wrestlers in the event that they land out of bounds. Chairs, tables, clocks, clipboards, etc., should not be permitted in the wrestling area.

Care of Mats. Wrestling mats should be disinfected daily to prevent bacteria from growing. Commercial disinfectants such as 20-blue, V3 Foam Mat cleaner are good for this purpose. If preventative measures are not taken, wrestlers may develop impetigo or other skin infections which could eliminate them from competition.

Protective equipment. Proper headgear and protective padding should be worn in practice and competition. No rings, watches, or jewelry should be worn while wrestling. Hair and nails should be well trimmed.

Proper Warm-up

As a rule, a 10- to 15-minute warm-up beginning slowly and progressing to deep respiration is sufficient. Normally this is accompanied by signs of slight perspiration. An adequate warm-up will raise the body temperature to a point where the body performs more efficiently. Stretching should also be included with the warm-up to improve muscle flexibility and to help reduce stiffness of joints.

Studies have shown that over one-third of the injuries in high school wrestling occur in the first minute of competition. These findings suggest a lack of proper warm-up before going to the mat.

A good method of warm-up is to drill many of the specific moves in a reactionary sequence to prepare the wrestler for competition. (Wrestlers respond to the commands of the coach). This method provides a warm-up and acts as a reinforcement for technique.

Conditioning

An individual in normal physical condition should be able to reach a fairly high level of fitness after 5 to 6 weeks of intensive training in preparation for competitive matches. Naturally, athletes who have conditioned themselves all year would be further ahead than those who only train during the season. Running and weight training have proven to be very beneficial in the off-season. In-season conditioning should include 25 to 30 minutes of running, rope climbing, rope skipping, spinning, bridging, push-ups, dips, pull-ups, etc. Gradual overloading of wrestling itself will probably prove to be the best single conditioner. Short and hard periods of competition will help produce the explosiveness which is an asset in competition.

Conditioning at the end of practice is considered best. Pre-practice conditioning will fatigue the wrestlers before competition, thereby resulting in possible injury.

Recommendations for Injury Prevention

Due to the physical nature of wrestling and the risk of injury, serious consideration should be given to the proper supervision of wrestling programs. For example, a dangerous situation exists whenever coaches attempt to handle large numbers of wrestlers in a limited area.

Coaches should begin the practice sessions with proper warm-up and progress through the season with gradual increasing amounts of conditioning. Caution should also be taken in the first few minutes of practice when wrestlers are working on their feet. Statistics have proven that there is more potential for injury during this period of time.

It is also imperative that contestants be matched in practice by weight and experience to reduce the possibility of injury.

Weight charts should be posted in the wrestling room to determine if wrestlers are losing weight sensibly. (e.g. gradual reduction).

Sick athletes with colds or infections should not be allowed to participate in practice.

In addition to mandatory physical examinations, all sick or injured wrestlers should be checked by a qualified trainer or physician. Coaches should work closely with trainers and athletes to be sure that the injured receive sound treatment on a regular basis. Treat all injuries promptly and properly.

Well padded rooms, free from obstacles, and good protective equipment are essential. Keep mats and clothing as clean as possible.

It is also important that wrestlers have adequate knowledge of techniques and rules before they are allowed to participate in competition. It has been proven that injuries decrease as experience is gained.

Wrestle down on the mat for a couple of weeks before starting with takedowns.

Be sure that wrestlers are properly conditioned before being allowed to go into competition. Include warm-up before each practice and competition.

Hire only qualified coaches and officials.

Competent Coaching and Officiating

It is probable that some injuries in wrestling may be attributed to inadequate coaching. Fortunately, most of our present high high school and college coaches were former wrestlers themselves and have good knowledge concerning wrestling techniques and the types and amounts of exercise to use. Hopefully, coaches will continue to become more knowledgeable in the future.

Wrestling officials also play an important role in the safety of wrestlers. Therefore, officials should be required to pass a thorough examination which includes both a written and practical test. Officials should be in reasonably good physical condition to be able to move quickly to prevent injuries in out-of-bounds situations and to block potentially dangerous situations. A good rule for officials to remember is that "anything that endangers life or limb is illegal in amateur wrestling."

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